

REMARKS

Applicant thanks the Examiner for the thorough consideration given the present application.

Claims 1, 2, 4, 5, and 7-10 are pending in this application. Claims 1 and 4 are independent. Claims 1 and 4 are amended.

Reconsideration of this application, as amended, is respectfully requested.

Drawings

The drawings are objected to because the limitation recited in claim 1 of "depositing a conductive layer on a substrate" is not depicted. In response, claim 1 is amended to recite "depositing a conductive layer *over* a substrate". This feature is illustrated in FIG. 2C. Withdrawal of the objection to the drawings is, therefore, respectfully requested.

In view of the indication on page 2 of the Office Action that the proposed drawing changes filed April 30, 2002, are approved, corrected formal drawings are submitted concurrently herewith. Approval of the corrected formal drawings is respectfully requested.

MARKED-UP COPY OF AMENDED CLAIMS

IN THE CLAIMS:

Claims 3 and 6 are canceled.

Claims 1 and 4 are amended as follows:

1. (Amended) A method for fabricating a capacitor of a semiconductor device comprising:

depositing a conductive layer [on] over a substrate;

forming a photoresist pattern on the conductive layer;

etching the conductive layer using the photoresist pattern as a mask to form a lower electrode;

removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode, wherein the etching gas is one of H₂O, a mixture of H₂ and O₂ in which an amount of H₂ is smaller than an amount of O₂, a mixture H₂O, NH₃, and N₂, a mixture of N₂ and NH₃, a mixture of NH₃ and H₂O, and a mixture of N₂ and H₂O; and

forming a dielectric film and an upper electrode on a surface of the lower electrode.

4. (Amended) A method for fabricating a capacitor of a semiconductor device comprising:

forming a conductive region on a semiconductor substrate;

forming an interleaving insulating film having a contact hole therein over the conductive region;

forming a contact plug within the contact hole;

forming insulating film patterns on [of] the interleaving insulating film to expose the contact plug and the interleaving insulating film adjacent to the contact plug;

depositing a barrier film and a first conductive layer on the contact plug and the insulating film patterns;

forming a photoresist over the contact plug between the insulating film patterns;

sequentially removing the first conductive layer and the barrier film on the insulating film patterns using the photoresist as a mask, thereby forming a lower electrode and a barrier film in a U-shape in cross-section;

removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode, wherein the etching gas is one of H₂O, a mixture of H₂ and O₂ in which an amount of H₂ is smaller than an amount of O₂, a mixture H₂O, NH₃, and N₂, a mixture of N₂ and NH₃, a mixture of NH₃ and H₂O, and a mixture of N₂ and H₂O;

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removing the insulating film patterns; and
sequentially forming a dielectric film and an upper electrode on the lower
electrode and the barrier film.

Rejection under 35 U.S.C. § 103(a)

Claims 1-10 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Applicant's disclosed related art¹ in view of U.S. Patent No. 5,230,772 to Kadomura. This rejection is respectfully traversed.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application, independent claims 1 and 4 have been amended to recite a combinations of steps in a method for fabricating a capacitor of a semiconductor device including "removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode, wherein the etching gas is one of H₂O, a mixture of H₂ and O₂ in which an amount of H₂ is smaller than an amount of O₂, a mixture H₂O, NH₃, and N₂, a mixture of N₂ and NH₃, a mixture of NH₃ and H₂O, and a mixture of N₂ and H₂O." Applicants respectfully submit that these combinations of steps as set forth in independent claims 1 and 4, as amended, are not disclosed or made obvious by the prior art of record, including Applicant's disclosed related art and Kadomura.

¹ It is not certain whether Applicant's disclosed related art qualifies as prior art under 35 U.S.C. §102. Nevertheless, Applicant will address the rejection assuming that it is for the sake of the argument.

As admitted on page 3 of the Office Action, Applicant's disclosed related art does not teach removing the photoresist using an etching gas that is non-reactive with respect to the lower electrode. The Office Action relies on Kadomura for a teaching of a dry etching method for suppressing the micro-loading effects during etching of resist material by using NH_3 to remove the photoresist layer. Applicant respectfully submits that Kadomura fails to teach or suggest, *inter alia*, that the etching gas is "one of H_2O , a mixture of H_2 and O_2 in which an amount of H_2 is smaller than an amount of O_2 , a mixture H_2O , NH_3 , and N_2 , a mixture of N_2 and NH_3 , a mixture of NH_3 and H_2O , and a mixture of N_2 and H_2O ," as recited in the presently claimed invention.

Applicant respectfully submits that Applicant's disclosed related art and Kadomura, whether taken singly or in combination, fails to disclose or render obvious the presently claimed invention, and withdrawal of the rejections based thereon is respectfully requested. Accordingly, independent claims 1 and 4 are in condition for allowance. With regard to dependent claims 2, 5, and 7-10, these claims depend either directly or indirectly from independent claims 1 and 4. Therefore, they are allowable for at least the same reasons set forth in the preceding discussion, or for the additional limitations provided by these claims.

Conclusion

The stated grounds of rejection has been properly traversed, accommodated, or rendered moot. Applicant, therefore, respectfully requests that the Examiner reconsider the presently outstanding rejection and that it be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and that the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Sam Bhattacharya (Reg. No. 48,107) at 703-205-8000.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or to credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly extension of time fees.

Respectfully submitted,
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465-758P
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